

VACUUM BRAZING

Giving you a clear edge

APPLICATION NOTE



Where is vacuum used?

The brazing process is the joining of metals by flowing thin layer, of capillary thickness, of non-ferrous filler material into the space between the metals. The intimate contact produced by the dissolution of a small amount of base metal and the molten filler metal, results in bonding without fusion of the base metal.

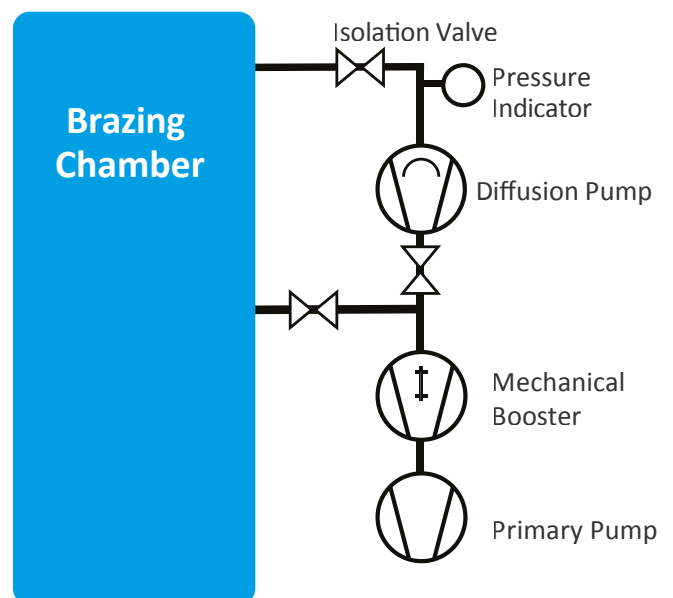
Vacuum aids this process by removing all gases in the brazing area and by improving the metal wetting properties. Vacuum plus high temperature results in decomposing oxide layers.

The brazing process consists of pump down to 1μ (10^{-3} mbar), and heating in different steps; vacuum is maintained below 0.1μ (10^{-4} mbar) during heating. Cooling can be achieved with Argon backfilling.

Typical vacuum brazing system

Historically oil sealed pumps and diffusion pumps have been used in the brazing process. More recently dry roughing pumps and turbo molecular pumps, duly protected from radiated heat, are becoming the technology of choice, especially when the cleanliness of the final product is very important.

Typical Layout For Vacuum Brazing



Dry pumping systems - Recommended technology

GXS dry screw pumps and GMB booster combinations

- GXS160, GXS160/1750
- GXS250, GXS250/2600
- GXS450, GXS450/2600, GXS450/4200
- GXS750, GXS750/2600, GXS750/4200

High Throughput series with the following models:

- STP-H301, STP-H451, STP-A803, STP-A1303, STP-A1603, STP-A2203, STP-XA2703, STP-XA3203, STP-XA4503

Integrated Controller Series with the following models:

- STP-iX455, STP-iXL455, STP-iXR1606, STP-iXR2206, STP-iXA3306, STPiX3006, STPiXA4506

Benefit: Dry pump systems substantially reduce maintenance and operating costs.

- Increased tolerance to particles created during brazing process
- Clean residual vacuum
- Elimination of oil back streaming which is a source of contamination of the final product
- Elimination of oil mist at the exhaust and external oil leaks

Oil Sealed pumping systems - Conventional technology

Stokes microvac rotary piston pumps with EH and 6" Stokes booster combination

- 212J
- 412J
- 612J

Diffusion pumps

- HT10
- HT16B
- HT20B

Benefit: Generally, oil sealed pumps have high operating and maintenance costs. If oil sealed technology is to be used, piston pumps are the vacuum pump of choice.

- Rugged and less sensitive to dust and vapour handling
- Robust simple mechanism for high reliability and ease of rebuild
- Low rotational speed enables the longest pump life cycle
- Choice of pumping combinations available with different boosters

Edwards' Benefits

GXS dry screw pumps

160 m³/h -750 m³/h primary pumps with pumping speeds up to 3,450 m³/h with vacuum boosters. Equipped with an intelligent on-board controller with extensive communication and automated control capabilities.

Highly reliable

Ability to handle harsh processes

Low maintenance cost

No unplanned down-time

Increased productivity

Longer intervals between services

Safe operation, consistent output

Automated control of your process



Microvac rotary piston pumps

Packaged with EH range or 6" series of mechanical boosters

Value for investment

Low rotational speed enables the longest pump life cycle

Easy maintenance on site

Robust simple mechanism for high reliability and ease of rebuild

Proven, tested; peace of mind

Over 80 years of time tested proven performance



STPs Turbomolecular pumps

Our magnetically levitated turbomolecular pumps are available in a range up to 4,500 ls^{-1} and offer a multi axis bearing system. The rotor is entirely suspended by magnetic bearings so all contact between the rotor and the remainder of the pump is eliminated.

Increased productivity

Quicker pump down to base pressure

Low cost of ownership

Low power and utilities consumption

Economical

Maintenance free



Diffusion pumps

Our industrial high throughput diffusion pumps, available in sizes up to 18,000 ls^{-1} , are ideal for application in vacuum brazing.

Increased productivity

High throughput pumping

Stable performance

High backing line pressure

Better end-product quality

Low oil back streaming

Clean process

Stainless steel body



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